

# PATENT SPECIFICATION

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## NO DRAWINGS

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## (54) METHOD OF STRAIGHTENING AND DYEING HUMAN HAIR

(71) We, WELLA AKTIENGESSELLSCHAFT of, Berliner Allee 65, 61 Darmstadt, Germany, a German Company, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a process for the straightening of naturally curly human hair with alkali hydroxides, which at the same time renders possible dyeing of the hair with oxidising dyestuffs.

In general for the straightening of curly human hair alkali hydroxides or specific reducing sulphur compounds are used which pertain either to the group of inorganic sulphites or bisulphites or to that of the organic thioglycolates. These substances are capable of softening the keratin of the human hair in its structure and bringing about a durable deformation.

The manner in which the straightening of the hair takes place with the aid of alkali hydroxides is usually that the preparations, mostly in cream form, are applied to the hair strand by strand and permitted to act there for 10—60 minutes. During the time of action the hair is smoothed from time to time with the comb or the fingers. In conclusion the cream is then rinsed thoroughly out of the hair with water.

If the hair straightening is carried out with sulphites or bisulphites or with thioglycolates, it is necessary after their action and subsequent rinsing to effect also a fixing with the aid of oxidizing agents in order to reclose the split bridge bonds on the hair keratin and to achieve a durable straightening.

Frequently however it is the case that not only straightening of the hair but also a variation of colour, for example in the case of greying hair, is desired. In this case it would be necessary to carry out a separate dyeing treatment following upon the straightening treatment.

Nowadays the dyeing of human hair is

effected preferably with dying agents based upon oxidizing dyestuffs. Such media as is known contain combinations of aromatic amines and derivatives thereof with so-called toning dyes (modifiers) which are necessary for the achievement of specific colour shades. They were described for example by Sagarin in the book "Cosmetics, science and technology" (1957), pages 496 and 515. The oxidizing dyestuffs coming under consideration are also listed in the Colour Index, second edition, volume 3, 1956 under Nos. 76,000 to 76,650.

For hair dyeing, the dyeing agents usually adjusted to alkalinity with ammonia are mixed before use with an oxidizing agent, for example aqueous hydrogen peroxide solution, and the mixture is applied to the hair. After a time of action of about 20—40 minutes the hair is correspondingly dyed and can then be rinsed and dried.

Now it has been found that according to the process as claimed it is possible to achieve a straightening and dyeing of curly hair in one single treatment. For this purpose media containing alkali hydroxides and oxidizing dyestuffs are mixed shortly before use with an oxidizing agent and the mixture is applied to the hair. During the time of action, which amounts to 15—50 minutes, the hair is smoothed from time to time by combing. According to the concentration of the active substances and the structure of the hair, the time of action can vary, and sometimes a shorter or longer action than stated can also be advantageous. The treatment is concluded when the desired result of straightening and dyeing is reached.

It has appeared that in this way the straightening of the hair is not impaired by the simultaneous dyeing. On the other hand simultaneous straightening and dyeing are not possible when sulphites or bisulphites or thioglycolates are used as straightening active substances, since these reducing agents are oxidized in the subsequent oxidation and thus lose their keratin-softening effectiveness.

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It has proved expedient if the means used according to the process are applied in thickened form to the hair, for example as cream, jelly or viscous liquid, because thus the straightening action is supported and running out of the hair is avoided.

The hydroxides of sodium, potassium or lithium which are known for hair straightening come under consideration as alkali hydroxides. Their concentration of free alkali hydroxide in the media should preferably amount to between 2 and 3% by weight. The known and cited combinations of oxidizing and toning dyestuffs serve for the dyeing. The media containing alkali hydroxides and dyestuffs have pH-values of 12—13.8.

Hydrogen peroxide, percarbamide, melamine peroxide or perborax are suitable mainly as oxidizing agents; however such agents for example as percarbonate or sodium pyrophosphate perhydrate are also suitable.

The media utilised according to the process can of course contain usual and known additives such as swelling agents, emulsifiers, thickeners, stabilizers, anti-oxidants such as ascorbinic acid or sodium sulphite, perfume oils, etc.

The percentage figures given represent percentages by weight.

The following examples are to explain the object of the application in greater detail without limiting it thereto.

#### EXAMPLE 1

A medium in cream form (with 2.5% free NaOH) of the composition:—

|    |                                      |  |
|----|--------------------------------------|--|
|    | 4.1 g sodium hydroxide               |  |
|    | 2.2 g p - toluylene diamine sulphate |  |
|    | 1.1 g resorcin                       |  |
|    | 14.4 g cetylstearyl alcohol          |  |
| 40 | 1.6 g sodium lauryl sulphate         |  |
|    | 0.2 g ascorbinic acid                |  |
|    | 76.4 g water                         |  |
|    | <hr/> 100.0 g                        |  |

is mixed shortly before use with 5 ml of an 18% hydrogen peroxide solution (or with 4 g of melamine peroxide) and applied to grey naturally curly hair. After 35 minutes time of action, during which smoothing by combing is effected at intervals, the hair is well rinsed out with water and dried. The dry hair is straightened and dyed medium brown.

#### EXAMPLE 2

A medium in gel form (with 2.9% free NaOH) of the composition

|  |  |    |
|--|--|----|
|  | 4.03 g sodium hydroxide  | 55 |
|  | 3.00 g p - phenylene diamine   |    |
|  | 0.30 g 8 - hydroxy quinoline   |    |
|  | 3.50 g carboxy vinyl polymerisate (carbopol 934) Carbopol is a registered Trade Mark | 60 |
|  | 0.20 g ascorbinic acid   |    |
|  | 0.20 g perfume oil   |    |
|  | 88.77 g water  |    |
|  | <hr/> 100.00 g   |    |

is mixed shortly before use with 2 g of perborax  $\text{Na}_2\text{B}_4\text{O}_7 \cdot (\text{H}_2\text{O})_3$  and applied to curly greying hair. After 20 minutes of action, during which the hair is combed smooth several times, it is rinsed out well with water and dyed. The straightened dry hair is dyed black.

#### EXAMPLE 3

A cream (with 2.3% free NaOH) of the composition

|  |                               |    |
|--|-------------------------------|----|
|  | 3.03 g sodium hydroxide       | 75 |
|  | 1.00 g p - phenylene diamine  |    |
|  | 1.00 g resorcin               |    |
|  | 7.20 g cetylstearyl alcohol   |    |
|  | 0.80 g sodium lauryl sulphate |    |
|  | 0.20 g sodium sulphite        | 80 |
|  | 0.50 g perfume oil            |    |
|  | remainder water to            |    |
|  | <hr/> 100.00 g                |    |

is mixed shortly before use with 5 g of percarbamide, this mixture is applied to curly grey hair and left to act for 40 minutes, with repeated combing. After rinsing with water and drying the straightened hair is dyed brown.

The same result is obtained if the proportion of 3.03 g sodium hydroxide is replaced by 4.25 g potassium hydroxide or 1.82 g lithium hydroxide. These proportions produce 3.2% free potassium hydroxide or 1.38% free lithium hydroxide respectively.

## EXAMPLE 4

A medium in gel form (with 2% free NaOH) of the composition

|    |   |
|----|---|
|    | 3.00 g sodium hydroxide   |
| 5  | 3.00 g p - phenylene diamine  |
|    | 0.20 g sodium sulphite  |
|    | 3.50 g carboxy vinyl polymerisate<br>(carbopol 934) Carbopol is a<br>registered Trade Mark. |
| 10 | 90.30 g water   |
|    | <u>100.00 g</u>   |

is mixed shortly before use with 5 ml of 18% hydrogen peroxide solution and the mixture is applied to grey naturally curly hair. After 15 30 minutes time of action, during which the hair is combed smooth several times, it is rinsed well with water and dried. The hair is straightened and dyed reddish-brown.

## WHAT WE CLAIM IS:—

- 20 1.) A process for the straightening and simultaneous dyeing of curly human hair,

characterised in that media containing alkali hydroxides and oxidising dyestuffs are mixed shortly before use with oxidizing agents, the mixture is applied to the hair and after a 25 sufficient time of action, during which the hair is smoothed several times by combing, the hair is rinsed and dried.

2.) A process according to Claim 1, characterised in that sodium, potassium or lithium 30 hydroxide are used as alkali hydroxides for the softening of the hair keratin.

3.) A process according to Claim 1, characterised in that as oxidizing agents there are used especially hydrogen peroxide, per- 35 carbamide, melamine peroxide or perborax.

4.) A process for the straightening and simultaneous dyeing of curly human hair, substantially as hereinbefore described.

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